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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HANLEY, JOHN C	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	10/032,384	WARD, TALMADGE D.	
	Examiner	Art Unit	
	John C Hanley	2856	

-- The MAILING DATE of this communication appears on the cov r sh et with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, all of the structural elements of the claims must be shown or the feature(s) canceled from the claim(s). For example, the three shafts, the probe, the transducers, the counterweights, the inner frame, the outer frame, etc., must be depicted in the drawings. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because of the legal phraseology of patent claims is used. Correction is required. See MPEP § 608.01(b).

4. Claims 17 and 19 are objected to because of the following informalities: "is" is spelled "os" in Claim 17, line 1; and "to for" is improper in Claim 19, line 2. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant states in paragraph [27] of the specification, "The method used to balance the Normetex pump is generally the RIC method with the very significant exception that the machine operates in a structural resonance condition and hence all balancing work is performed at the resonant speed." However, applicant fails to teach how one gets from data acquisition to measurement results. Applicant fails to teach one how to modify the RIC method, used in a procedure different than applicants, to achieve a measurement result in applicant's procedure. Further, while applicant stressed that the uniqueness of his invention was measurement at resonance, only dependent claims 7 and 17 mention anything about resonance. Further, applicant states in paragraph [34] of the detailed description that "although each shaft/arbor has it's own imbalance with two planes for correction the resultant unbalance can be controlled as if there was only one shaft." Again, applicant has failed to teach how to achieve this result from the plural data sensors. Applicant has also stated in paragraph [30] that "An important factor is the proper selection and placement of appropriate transducers," yet states two sentences later the "The use of this particular combination is for illustration purposes and is not meant to limit the scope of the present

claimed invention," which appears contrary to the criticality expressed in the prior statement. In any event, if the placement is critical, applicant has not shown the specific location(s) of the sensor(s) on the various housings to make the specification enabling. It would appear to involve undue experimentation to locate proper placement of the various velocity sensors on the cases to achieve the desired measurement results. The above drawing and description objections, in combination with many statements in the description that the many elements and steps recited in the claims are generally known, render unclear what applicant regards as his invention. Further, it is unclear how applicant regards the collection of structural elements, indicated as known in the description, as novel. Further, applicant's use of the term "planes" seems to be inconsistent with the background art. It would seem that upper and lower counterweights would be placed in a single plane, not two planes as indicated by applicant. Likewise with 90 degree pairs of sensors.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 13-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant inferentially claims the pump and shaft(s) of the pump without ever positively reciting the pump and/or shaft(s) as elements of the system. Further, the various elements of the measurement system are defined by how they may be used on the non-recited pump and shaft, rather than reciting structural limitations. One example is velocity sensors "installed 90 degrees

from each other" when the only structural relationship between them is via a non-recited pump element.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's own admissions in view of Shiga et al (US-4,098,127) plus Fanuele (US-4485678). Applicant admits, via the specification, that balancing at other than resonant conditions by a system and method for measuring rotation phase with respect to a keyway, measuring vibration with velocity sensors, plugging data into a data acquisition system, and determining and using counterweight addition and/or removal using predetermined rotor influence coefficients is known in the art. Applicant's admissions of the prior art appear to lack only the positioning of a pair of velocity sensors at a 90-degree angle in a selected measurement plane, and obtaining data during resonant operation of the machine to be balanced. Also specifically lacking in applicant's admissions of the prior art is the specific positioning of the velocity sensors for the particular machine to be balanced. Shiga et al, cited by applicant, teach to measure unbalance of a multi-rotor machine at many speeds including critical (i.e., resonant) speeds and rated speed. To do so, velocity sensors are placed at a 90-degree angle with respect to one another on each measurement plane, rotation-synchronous data is acquired from the velocity sensors, and the data acquired is used,

along with predetermined influence coefficients, to determine proper counterweight adjustments to balance the machine. Fanuele teaches measuring imbalance of a multi-rotor machine at critical speed. A plurality of velocity sensors is mounted on the casing of the machine. Fanuele further indicates that the "number of sensors and their location may vary," and that "Consideration should be given to the dynamic characteristics and the theoretical responses of the particular rotor in choosing the number and location of the sensors needed." Vibration data is acquired from idle speed to full speed (at every 100 RPM interval as determined by rotor speed sensors), with full speed being just after the second critical speed of the low-pressure rotor. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to adapt the known elements and methodology of the admitted prior art, to correct unbalance in a multi-rotor machine by measuring the state of unbalance of the machine, while operating under resonant vibration conditions, with velocity sensors placed at 90-degree angles with respect to one another in each measurement plane, as taught in Shiga. It would have been further obvious in view of Fanuele to place the vibration sensors on the casing of a multi-rotor machine to be measured under resonant conditions, the particular number and placement of sensors being a choice determined by the dynamic characteristics and the theoretical responses of the particular rotor in choosing the number and location of the sensors needed, as stated by Fanuele.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Piety et al, Figure 7, shows sensors mounted at a 90-degree angle. Curtis et al, Ehrich, and Matsushita et al

teach balancing at critical speeds. Bankert et al and Heideri show use of influence coefficients for balancing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C Hanley whose telephone number is 703-305-5130. The examiner can normally be reached on M-F 9AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 703-306-4705. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JCH
May 8, 2003

HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800